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CORES FOR RADIO POWER TRANSFORMERS

Comment: The following information was taken from an article by V. Dvinskikh, Saratov, describing power transformer cores for the benefit of radio-amateur designers. Sections on selection of core construction and mechanical features of core assembly were omitted. Although the article is written primarily for radio amateurs building their own sets, the core materials mentioned may also be employed in commercial receiver production.

Ordinarily, type E4A and E4AA transformer steels are employed in the cores of power transformers used in radio receivers. The first type is characterized by low eddy current losses but is quite brittle because of its 4% silicon content. The brittleness of type E4A steel distinguishes it from other types of transformer steel which have a lower silicon content. The magnetic properties of type E4AA and E4A are the same, except that type E4AA has lower hysteresis losses than type E4AA.

Laminations for cores of power transformers can also be made from dynamo steels type El and E2, although these have poorer magnetic properties and higher losses than type E4A steel. Light sheet iron is similar in magnetic properties to type El steel.

Recently, special types of electrical steel, for example, KhVP and KhT-18, have come into use as core materials. These are characterized by high permissible values of induction. The use of KhVP and KhT-18 steels in radio-amateur practice is also very desirable. One must keep in mind, however, that the magnetic properties of these steels may differ by 10-15% from one factory shipment to the next.

Core laminations of all the above materials with the exception of KhYP and KhT-18 steels are produced in thicknesses of 0.35 or 0.5 mm. Although the production of thinner laminations would reduce eddy current losses in the core.

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it is not recommended for the following reasons. These losses account for 15-20% of the total core losses. If, for example, the lamination is made half as thick, the losses will be reduced by 10-15%. But a reduction in the thickness of the lamination will cause an increase in core losses of 8-10% because of the irregularity of the laminations and the presence of an oxide layer, leading to reduced active core cross section and increased induction.

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